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☐ 1: [Q9NX09](#). Reports DNA-damage-induci...[gi:74753036]

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LOCUS Q9NX09 232 aa linear PRI 13-NOV-2007

DEFINITION DNA-damage-inducible transcript 4 protein (Protein regulated in development and DNA damage response 1) (REDD-1) (HIF-1 responsive protein RTP801).

ACCESSION Q9NX09

VERSION Q9NX09.1 GI:74753036

DBSOURCE swissprot: locus DDT4_HUMAN, accession [Q9NX09](#);
class: standard.
extra accessions:Q9H0S3
created: Oct 23, 2007.
sequence updated: Oct 1, 2000.
annotation updated: Nov 13, 2007.
xrefs: [AY090097.1](#), [AAM10442.1](#), [AF335324.1](#), [AAL38424.1](#), [AK000507.1](#),
[BAA91214.1](#), [AL136668.1](#), [CAB66603.1](#), [AL683820.13](#), [CAH73863.1](#),
[CH471083.1](#), [EAW54452.1](#), [BC000708.1](#), [AAH00708.1](#), [BC007714.1](#),
[AAH07714.1](#), [BC015236.1](#), [AAH15236.1](#)
xrefs (non-sequence databases): RefSeq:[NP_061931.1](#),
UniGene:[Hs.523012](#), Ensembl:[ENSG00000168209](#), GeneID:[54541](#),
KEGG:[hsa:54541](#), HGNC:[24944](#), MIM:[607729](#), PharmGKB:[PA134977994](#),
ArrayExpress:[Q9NX09](#), InterPro:[IPR012918](#), PANTHER:[PTHR12478](#),
Pfam:[PF07809](#)

KEYWORDS Apoptosis; Cytoplasm.

SOURCE Homo sapiens (human)

ORGANISM Homo sapiens
Eukaryota; Metazoa; Chordata; Craniata; Vertebrata; Euteleostomi;
Mammalia; Eutheria; Euarchontoglires; Primates; Haplorrhini;
Catarrhini; Hominidae; Homo.

REFERENCE 1 (residues 1 to 232)

AUTHORS Ellisen,L.W., Ramsayer,K.D., Johannessen,C.M., Yang,A., Beppu,H.,
Minda,K., Oliner,J.D., McKeon,F. and Haber,D.A.

TITLE REDD1, a developmentally regulated transcriptional target of p63
and p53, links p63 to regulation of reactive oxygen species

JOURNAL Mol. Cell 10 (5), 995-1005 (2002)

PUBMED [12453409](#)

REMARK NUCLEOTIDE SEQUENCE [MRNA], TISSUE SPECIFICITY, INDUCTION BY DNA
DAMAGE, AND SUBCELLULAR LOCATION.
TISSUE=Fetal brain

REFERENCE 2 (residues 1 to 232)

AUTHORS Shoshani,T., Faerman,A., Mett,I., Zelin,E., Tenne,T., Gorodin,S.,
Moshel,Y., Elbaz,S., Budanov,A., Chajut,A., Kalinski,H., Kamer,I.,
Rozen,A., Mor,O., Keshet,E., Leshkowitz,D., Einat,P., Skaliter,R.
and Feinstein,E.

TITLE Identification of a novel hypoxia-inducible factor 1-responsive
gene, RTP801, involved in apoptosis

JOURNAL Mol. Cell. Biol. 22 (7), 2283-2293 (2002)

PUBMED [11884613](#)

REMARK NUCLEOTIDE SEQUENCE [MRNA], TISSUE SPECIFICITY, AND INDUCTION.

REFERENCE 3 (residues 1 to 232)

AUTHORS Ota,T., Suzuki,Y., Nishikawa,T., Otsuki,T., Sugiyama,T., Irie,R., Wakamatsu,A., Hayashi,K., Sato,H., Nagai,K., Kimura,K., Makita,H., Sekine,M., Obayashi,M., Nishi,T., Shibahara,T., Tanaka,T., Ishii,S., Yamamoto,J., Saito,K., Kawai,Y., Isono,Y., Nakamura,Y., Nagahari,K., Murakami,K., Yasuda,T., Iwayanagi,T., Wagatsuma,M., Shiratori,A., Sudo,H., Hosoiri,T., Kaku,Y., Kodaira,H., Kondo,H., Sugawara,M., Takahashi,M., Kanda,K., Yokoi,T., Furuya,T., Kikkawa,E., Omura,Y., Abe,K., Kamihara,K., Katsuta,N., Sato,K., Tanikawa,M., Yamazaki,M., Ninomiya,K., Ishibashi,T., Yamashita,H., Murakawa,K., Fujimori,K., Tanai,H., Kimata,M., Watanabe,M., Hiraoka,S., Chiba,Y., Ishida,S., Ono,Y., Takiguchi,S., Watanabe,S., Yosida,M., Hotuta,T., Kusano,J., Kanehori,K., Takahashi-Fujii,A., Hara,H., Tanase,T.O., Nomura,Y., Togiya,S., Komai,F., Hara,R., Takeuchi,K., Arita,M., Imose,N., Musashino,K., Yuuki,H., Oshima,A., Sasaki,N., Aotsuka,S., Yoshikawa,Y., Matsunawa,H., Ichihara,T., Shiohata,N., Sano,S., Moriya,S., Momiyama,H., Satoh,N., Takami,S., Terashima,Y., Suzuki,O., Nakagawa,S., Senoh,A., Mizoguchi,H., Goto,Y., Shimizu,F., Wakebe,H., Hishigaki,H., Watanabe,T., Sugiyama,A., Takemoto,M., Kawakami,B., Yamazaki,M., Watanabe,K., Kumagai,A., Itakura,S., Fukuzumi,Y., Fujimori,Y., Komiyama,M., Tashiro,H., Tanigami,A., Fujiwara,T., Ono,T., Yamada,K., Fujii,Y., Ozaki,K., Hirao,M., Ohmori,Y., Kawabata,A., Hikiji,T., Kobatake,N., Inagaki,H., Ikema,Y., Okamoto,S., Okitani,R., Kawakami,T., Noguchi,S., Itoh,T., Shigeta,K., Senba,T., Matsumura,K., Nakajima,Y., Mizuno,T., Morinaga,M., Sasaki,M., Togashi,T., Oyama,M., Hata,H., Watanabe,M., Komatsu,T., Mizushima-Sugano,J., Satoh,T., Shirai,Y., Takahashi,Y., Nakagawa,K., Okumura,K., Nagase,T., Nomura,N., Kikuchi,H., Masuho,Y., Yamashita,R., Nakai,K., Yada,T., Nakamura,Y., Ohara,O., Isogai,T. and Sugano,S.

TITLE Complete sequencing and characterization of 21,243 full-length human cDNAs

JOURNAL Nat. Genet. 36 (1), 40-45 (2004)

PUBMED 14702039

REMARK NUCLEOTIDE SEQUENCE [LARGE SCALE MRNA].

REFERENCE 4 (residues 1 to 232)

CONSRMT The German cDNA consortium

TITLE Direct Submission

JOURNAL Submitted (??-SEP-2004)

REMARK NUCLEOTIDE SEQUENCE [LARGE SCALE MRNA].

TISSUE=Brain

REFERENCE 5 (residues 1 to 232)

AUTHORS Mural,R.J., Istrail,S., Sutton,G.G., Florea,L., Halpern,A.L., Mobarry,C.M., Lippert,R., Walenz,B., Shatkay,H., Dew,I., Miller,J.R., Flanigan,M.J., Edwards,N.J., Bolanos,R., Fasulo,D., Halldorsson,B.V., Hannenhalli,S., Turner,R., Yooseph,S., Lu,F., Nusskern,D.R., Shue,B.C., Zheng,X.H., Zhong,F., Delcher,A.L., Huson,D.H., Kravitz,S.A., Mouchard,L., Reinert,K., Remington,K.A., Clark,A.G., Waterman,M.S., Eichler,E.E., Adams,M.D., Hunkapiller,M.W., Myers,E.W. and Venter,J.C.

TITLE Direct Submission

JOURNAL Submitted (??-JUL-2005)

REMARK NUCLEOTIDE SEQUENCE [LARGE SCALE GENOMIC DNA].

REFERENCE 6 (residues 1 to 232)

AUTHORS Deloukas,P., Earthworm,M.E., Grafham,D.V., Rubenfield,M., French,L., Steward,C.A., Sims,S.K., Jones,M.C., Searle,S., Scott,C., Howe,K., Hunt,S.E., Andrews,T.D., Gilbert,J.G., Swarbreck,D., Ashurst,J.L., Taylor,A., Battles,J., Bird,C.P., Ainscough,R., Almeida,J.P., Ashwell,R.I., Ambrose,K.D., Babbage,A.K., Bagguley,C.L., Bailey,J., Banerjee,R., Bates,K., Beasley,H., Bray-Allen,S., Brown,A.J., Brown,J.Y., Burford,D.C., Burrill,W., Burton,J., Cahill,P., Camire,D., Carter,N.P., Chapman,J.C., Clark,S.Y., Clarke,G., Clee,C.M., Clegg,S., Corby,N., Coulson,A., Dhami,P., Dutta,I., Dunn,M., Faulkner,L., Frankish,A., Frankland,J.A., Garner,P., Garnett,J., Gribble,S., Griffiths,C., Grocock,R., Gustafson,E., Hammond,S., Harley,J.L., Hart,E., Heath,P.D., Ho,T.P., Hopkins,B., Horne,J., Howden,P.J., Huckle,E., Hynds,C., Johnson,C., Johnson,D., Kana,A., Kay,M., Kimberley,A.M., Kershaw,J.K., Kokkinaki,M., Laird,G.K., Lawlor,S., Lee,H.M.,

Leongamornlert,D.A., Laird,G., Lloyd,C., Lloyd,D.M., Loveland,J.,
 Lovell,J., McLaren,S., McLay,K.E., McMurray,A.,
 Mashreghi-Mohammadi,M., Matthews,L., Milne,S., Nickerson,T.,
 Nguyen,M., Overton-Larty,E., Palmer,S.A., Pearce,A.V., Peck,A.I.,
 Pelan,S., Phillimore,B., Porter,K., Rice,C.M., Rogosin,A.,
 Ross,M.T., Sarafidou,T., Sehra,H.K., Shownkeen,R., Skuce,C.D.,
 Smith,M., Standring,L., Sycamore,N., Tester,J., Thorpe,A.,
 Torcasso,W., Tracey,A., Tromans,A., Tsolas,J., Wall,M., Walsh,J.,
 Wang,H., Weinstock,K., West,A.P., Willey,D.L., Whitehead,S.L.,
 Wilming,L., Wray,P.W., Young,L., Chen,Y., Lovering,R.C.,
 Moschonas,N.K., Siebert,R., Fechtel,K., Bentley,D., Durbin,R.,
 Hubbard,T., Doucette-Stamm,L., Beck,S., Smith,D.R. and Rogers,J.
 TITLE The DNA sequence and comparative analysis of human chromosome 10
 JOURNAL Nature 429 (6990), 375-381 (2004)
 PUBMED [15164054](#)
 REMARK NUCLEOTIDE SEQUENCE [LARGE SCALE GENOMIC DNA].
 REFERENCE 7 (residues 1 to 232)
 AUTHORS Gerhard,D.S., Wagner,L., Feingold,E.A., Shenmen,C.M., Grouse,L.H.,
 Schuler,G., Klein,S.L., Old,S., Rasooly,R., Good,P., Guyer,M.,
 Peck,A.M., Derge,J.G., Lipman,D., Collins,F.S., Jang,W., Sherry,S.,
 Feolo,M., Misquitta,L., Lee,E., Rotmistrovsky,K., Greenhut,S.F.,
 Schaefer,C.F., Buetow,K., Bonner,T.I., Haussler,D., Kent,J.,
 Kiekhaus,M., Furey,T., Brent,M., Prange,C., Schreiber,K.,
 Shapiro,N., Bhat,N.K., Hopkins,R.F., Hsie,F., Driscoll,T.,
 Soares,M.B., Casavant,T.L., Scheetz,T.E., Brownstein,M.J.,
 Usdin,T.B., Toshiyuki,S., Carninci,P., Piao,Y., Dudekula,D.B.,
 Ko,M.S., Kawakami,K., Suzuki,Y., Sugano,S., Gruber,C.E.,
 Smith,M.R., Simmons,B., Moore,T., Waterman,R., Johnson,S.L.,
 Ruan,Y., Wei,C.L., Mathavan,S., Gunaratne,P.H., Wu,J., Garcia,A.M.,
 Hulyk,S.W., Fuh,E., Yuan,Y., Sneed,A., Kowis,C., Hodgson,A.,
 Muzny,D.M., McPherson,J., Gibbs,R.A., Fahey,J., Helton,E.,
 Kettelman,M., Madan,A., Rodrigues,S., Sanchez,A., Whiting,M.,
 Madari,A., Young,A.C., Wetherby,K.D., Granite,S.J., Kwong,P.N.,
 Brinkley,C.P., Pearson,R.L., Bouffard,G.G., Blakesly,R.W.,
 Green,E.D., Dickson,M.C., Rodriguez,A.C., Grimwood,J., Schmutz,J.,
 Myers,R.M., Butterfield,Y.S., Griffith,M., Griffith,O.L.,
 Krzywinski,M.I., Liao,N., Morin,R., Palmquist,D., Petrescu,A.S.,
 Skalska,U., Smailus,D.E., Stott,J.M., Schnerch,A., Schein,J.E.,
 Jones,S.J., Holt,R.A., Baross,A., Marra,M.A., Clifton,S.,
 Makowski,K.A., Bosak,S. and Malek,J.
 CONSRTM MGC Project Team
 TITLE The status, quality, and expansion of the NIH full-length cDNA
 project: the Mammalian Gene Collection (MGC)
 JOURNAL Genome Res. 14 (10B), 2121-2127 (2004)
 PUBMED [15489334](#)
 REMARK NUCLEOTIDE SEQUENCE [LARGE SCALE MRNA].
 TISSUE=Kidney, and Uterus
 Erratum:[Genome Res. 2006 Jun;16(6):804. Morrin, Ryan [corrected to
 Morin, Ryan]]
 REFERENCE 8 (residues 1 to 232)
 AUTHORS Kim,J.R., Lee,S.R., Chung,H.J., Kim,S., Baek,S.H., Kim,J.H. and
 Kim,Y.S.
 TITLE Identification of amyloid beta-peptide responsive genes by cDNA
 microarray technology: involvement of RTP801 in amyloid
 beta-peptide toxicity
 JOURNAL Exp. Mol. Med. 35 (5), 403-411 (2003)
 PUBMED [14646594](#)
 REMARK INDUCTION.
 REFERENCE 9 (residues 1 to 232)
 AUTHORS Brugarolas,J., Lei,K., Hurley,R.L., Manning,B.D., Reiling,J.H.,
 Hafen,E., Witters,L.A., Ellisen,L.W. and Kaelin,W.G. Jr.
 TITLE Regulation of mTOR function in response to hypoxia by REDD1 and the
 TSC1/TSC2 tumor suppressor complex
 JOURNAL Genes Dev. 18 (23), 2893-2904 (2004)
 PUBMED [15545625](#)
 REMARK FUNCTION.
 REFERENCE 10 (residues 1 to 232)
 AUTHORS Lin,L., Qian,Y., Shi,X. and Chen,Y.

TITLE Induction of a cell stress response gene RTP801 by DNA damaging agent methyl methanesulfonate through CCAAT/enhancer binding protein
 JOURNAL Biochemistry 44 (10), 3909-3914 (2005)
 PUBMED [15751966](#)
 REMARK INDUCTION.
 REFERENCE 11 (residues 1 to 232)
 AUTHORS Corradetti,M.N., Inoki,K. and Guan,K.L.
 TITLE The stress-induced proteins RTP801 and RTP801L are negative regulators of the mammalian target of rapamycin pathway
 JOURNAL J. Biol. Chem. 280 (11), 9769-9772 (2005)
 PUBMED [15632201](#)
 REMARK FUNCTION.
 REFERENCE 12 (residues 1 to 232)
 AUTHORS Sofer,A., Lei,K., Johannessen,C.M. and Ellisen,L.W.
 TITLE Regulation of mTOR and cell growth in response to energy stress by REDD1
 JOURNAL Mol. Cell. Biol. 25 (14), 5834-5845 (2005)
 PUBMED [15988001](#)
 REMARK FUNCTION.
 REFERENCE 13 (residues 1 to 232)
 AUTHORS Schwarzer,R., Tondera,D., Arnold,W., Giese,K., Klippel,A. and Kaufmann,J.
 TITLE REDD1 integrates hypoxia-mediated survival signaling downstream of phosphatidylinositol 3-kinase
 JOURNAL Oncogene 24 (7), 1138-1149 (2005)
 PUBMED [15592522](#)
 REMARK INDUCTION.
 REFERENCE 14 (residues 1 to 232)
 AUTHORS Malagelada,C., Ryu,E.J., Biswas,S.C., Jackson-Lewis,V. and Greene,L.A.
 TITLE RTP801 is elevated in Parkinson brain substantia nigral neurons and mediates death in cellular models of Parkinson's disease by a mechanism involving mammalian target of rapamycin inactivation
 JOURNAL J. Neurosci. 26 (39), 9996-10005 (2006)
 PUBMED [17005863](#)
 REMARK FUNCTION, AND TISSUE SPECIFICITY.
 REFERENCE 15 (residues 1 to 232)
 AUTHORS Gery,S., Park,D.J., Vuong,P.T., Virk,R.K., Muller,C.I., Hofmann,W.K. and Koeffler,H.P.
 TITLE RTP801 is a novel retinoic acid-responsive gene associated with myeloid differentiation
 JOURNAL Exp. Hematol. 35 (4), 572-578 (2007)
 PUBMED [17379067](#)
 REMARK FUNCTION, TISSUE SPECIFICITY, AND INDUCTION.
 COMMENT On Nov 13, 2007 this sequence version replaced [gi:74718013](#).
 [FUNCTION] Inhibits cell growth by regulating the FRAP1 pathway upstream of the TSC1-TSC2 complex and downstream of AKT1. Promotes neuronal cell death.
 [SUBCELLULAR LOCATION] Cytoplasm.
 [TISSUE SPECIFICITY] Broadly expressed, with lowest levels in brain, skeletal muscle and intestine. Up-regulated in substantia nigra neurons from Parkinson disease patients (at protein level).
 [INDUCTION] Up-regulated in fibroblasts upon ionizing radiation, via a TP53-dependent pathway. Up-regulated by TP63 in primary keratinocytes, and down-regulated during keratinocyte differentiation. Up-regulated upon DNA alkylation. Up-regulated by amyloid beta-peptide and retinoic acid. Up-regulated by hypoxia, via a PI3K and HIF1A-dependent but TP53/TP63-independent mechanism (at protein level).
 [SIMILARITY] Belongs to the DDIT4 family.
 FEATURES
 source Location/Qualifiers
 1..232
 /organism="Homo sapiens"
 /db_xref="taxon:9606"
 gene 1..232
 /gene="DDIT4"
 /note="synonyms: REDD1, RTP801"

Protein

1..232

/gene="DDIT4"

/product="DNA-damage-inducible transcript 4 protein"

Region

1..232

/gene="DDIT4"

/region_name="Mature chain"

/experiment="experimental evidence, no additional details recorded"

/note="DNA-damage-inducible transcript 4 protein.

/FTId=PRO_0000307197."

Region

104..223

/gene="DDIT4"

/region_name="RTP801_C"

/note="RTP801 C-terminal region. The members of this family are sequences similar to the C-terminal region of RTP801, the protein product of a hypoxia-inducible factor 1 (HIF-1)- responsive gene; pfam07809"

/db_xref="CDD:71249"

Region

228

/gene="DDIT4"

/region_name="Conflict"

/experiment="experimental evidence, no additional details recorded"

/note="L -> P (in Ref. 4; CAB66603)."

ORIGIN

1 mpslwdrfss sstssspssl prtptpdrpp rsawgsatre egfdrstsls ssdcesldss

61 nsgfgpeedt ayldgvslpd fellsdpede hlcanlmqll qeslaqarlg srrparllmp

121 sqlvsqvgke llrlaysepc glrgalldvc veqgkschsv gglaldpslv ptfqtltlvr

181 ldsrlwpkiq glfssanspf lpgfsqsltl stgfrvikkk lysseqilie ec

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